

AMENDMENTS TO THE CLAIMSClaims

This listing of claims will replace all prior versions, and listings, of claims in the application:

- Sub 1
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1. (Original) A rotary drill bit for penetrating earth strata, the drill bit comprising: an elongate bit body having an axial forward end; and a monolithic hard insert being affixed to the bit body at the axial forward end thereof, and the hard insert presenting at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three cutting edges is stepped.
  2. (Original) The rotary drill bit of claim 1 wherein said at least three stepped cutting edges has an upper step and a lower step.
  3. (Original) The rotary drill bit of claim 2 wherein each leading cutting edge of the upper step and each leading cutting edge of the lower step are parallel.
  4. (Original) The rotary drill bit of claim 2 wherein both said leading cutting edge of the lower step and said leading cutting edge of the upper step are oriented at an angle of about 20 degrees with respect to the horizontal.
  5. (Previously Amended) The rotary drill bit of claim 2 wherein a cutting edge transition portion is positioned between the lower step cutting edge and the upper step cutting edge the transition portion rises a vertical height of generally between 1/16-1/8 inches.
  6. (Original) The rotary drill bit of claim 1 wherein the rotary drill bit has a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially

Subcut outward of the central axis of the hard insert and extends in a direction away from the central axis.

7. (Original) The rotary drill bit of claim 1 wherein said at least three leading cutting edges for cutting the earth strata being formed by a corresponding leading surface of the hard insert intersecting a corresponding top surface of the hard insert.

8. (Previously Amended) The rotary drill bit of claim 6 wherein each of the stepped cutting edges has a radially inward upper step and a radially outward lower step.

9. (Original) The rotary drill bit of claim 8 wherein each of said upper steps have a length of generally between 1/8-1/4 inches.

B1 10. (Original) The rotary drill bit of claim 1 wherein each one of said leading cutting edges has a leading surface being disposed at a rake angle of between about zero degrees and about negative fifteen degrees.

11. (Original) The rotary drill bit of claim 2 wherein each one of said cutting edges has a lower leading surface adjacent the lower step cutting edge being disposed at a rake angle of between about zero degrees and about negative fifteen degrees.

12. (Original) The rotary drill bit of claim 11 wherein each one of said upper steps has an upper leading surface adjacent the upper step cutting edge the upper step cutting edge being disposed at a rake angle of between about negative five degrees and about negative fifteen degrees.

13. (Original) The rotary drill bit of claim 2 wherein the upper step cutting edge has a top surface relief angle of about 30 degrees and the lower step has a top surface relief angle of about 21 degrees.

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14. (Original) The rotary drill bit of claim 2 wherein the lower step has a generally planar lower rake surface and the upper step has a second generally planar upper rake surface.

15. (Original) The rotary drill bit of claim 14 wherein the lower rake surface is oriented at an angle with the vertical different from an angle which said upper rake surface makes with the vertical.

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16. (Original) The rotary drill bit of claim 15 wherein the lower rake surface angle is between zero and negative ten degrees and the upper rake surface angle is zero and fifteen degrees.

17. (Original) The rotary drill bit of claim 16 wherein said lower rake angle is zero degrees and the upper rake angle is negative five degrees.

18. (Cancelled)

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19. (Previously Amended) A rotary drill bit for penetrating earth strata, the drill bit comprising: an elongate bit body having an axial forward end; and a monolithic hard insert being affixed to the bit body at the axial forward end thereof, and the hard insert having at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three leading cutting edges are nonlinear.

20. (Original) The rotary drill bit of claim 19 wherein the hard insert has a generally planar lower rake surface and a second generally planar upper rake surface.

21. (Original) The rotary drill bit of claim 19 wherein the rotary drill bit has a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

22. (cancelled).

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23. (Previously Amended) A monolithic hard member for attachment to a drill bit body so as to form a rotary drill bit for penetrating the earth strata and the rotary drill bit having a central longitudinal axis, the monolithic hard member comprising: at least three discrete leading cutting edges for cutting the earth strata, projecting from the forward surface of the hard member wherein each said at least three cutting edges, is stepped whereby the step improves the disintegration of the earth strata.

24. (cancelled).

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25. (Previously Amended) The hard member of claim 23 wherein the hard insert further including a side clearance cutting edge for cutting the earth strata corresponding to each one of the leading cutting edges for cutting the earth strata.

26. (Previously Amended) The rotary drill bit of claim 23 wherein said at least three stepped cutting edges has an upper step and a lower step.

27. (Original) The rotary drill bit of claim 26 wherein each leading cutting edge of the upper step and each leading cutting edge of the lower step are parallel.

28. (Original) The rotary drill bit of claim 23 wherein the rotary drill bit having a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

29. (Original) The rotary drill bit of claim 26 wherein each one of said upper steps has an upper leading surface adjacent the upper step cutting edge the upper step

Subcl 7 ~~cutting edge being disposed at a rake angle of between about zero degrees and about fifteen degrees.~~

30. (Original) The rotary drill bit of claim 29 wherein the lower step has a generally planar lower rake surface and the upper step has a second generally planar upper rake surface.

31. (Original) The rotary drill bit of claim 30 wherein the lower rake surface is oriented at an angle with the vertical different from an angle which said upper rake surface makes with the vertical.

B4 32. (Previously Amended) A monolithic hard member for attachment to a drill bit body so as to form a rotary drill bit for penetrating the earth strata said hard member comprising: at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three leading cutting edges are nonlinear.

33. (Original) The hard member according to claim 32 wherein the leading cutting edge has an upper step and a lower step.

34. (Original) The hard member according to claim 33 wherein the lower step has a generally planar lower rake surface and the upper step has a second generally planar upper rake surface.

35. (Original) The hard member of claim 32 wherein the rotary drill bit has a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

36. (Cancelled).

Subcl 7 37. (Previously Added) A mining roof bit having a monolithic ~~hard~~ member comprising: at least three discrete

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Sub 17 leading cutting edges for cutting the earth strata wherein each said at least three leading cutting edges are nonlinear.

38. (Previously Added) The mining roof bit of claim 37 wherein each of the leading cutting edges has a radially inward upper step and a radially outward lower step.

B5 39. (Previously Added) The mining roof bit of claim 37 wherein each of the leading cutting edges essentially consists of a radially inward upper step and a radially outward lower step with a transition portion between said upper step and said lower step.

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